

# 2022 Plumbing

## Program Standards

### CONTENT STANDARD 1.0: Demonstrate Career Basics

#### Performance Standard 1.1: Identify Plumbing-Related Career Pathways

- 1.1.1 Identify and maintain licensing and industry credentialing requirements.
- 1.1.2 Research postsecondary apprenticeship program opportunities and requirements
- 1.1.3 Identify residential, commercial, service plumbing, and industrial career opportunities.
- 1.1.4 Identify the roles of other trades represented on the jobsite.

#### Performance Standard 1.2: Adhere to Idaho Plumbing Code and Rules

- 1.2.1 Describe the process for modifying legislation governing plumbing code and rules.
- 1.2.2 Describe the Idaho Plumbing Code and Administrative Rules requirements and how to use the reference.

### CONTENT STANDARD 2.0: Practice Jobsite and Tool Safety

#### Performance Standard 2.1: Practice Jobsite Safety

- 2.1.1 Describe the safety precautions associated with work in trenches.
- 2.1.2 Describe the safety precautions associated with confined spaces.
- 2.1.3 Describe jobsite safeguards and emergency response procedures.
- 2.1.4 Identify personal protective equipment (PPE) requirements.
- 2.1.5 Demonstrate material handling, storage, use, and disposal procedures.
- 2.1.6 Demonstrate precautions for ladder safety.
- 2.1.7 Describe stairway and scaffold hazards and precautions.
- 2.1.8 Describe lockout/tagout procedures.
- 2.1.9 Describe the importance of safety procedures for brazing and soldering.
- 2.1.10 Earn an OSHA-10 card.
- 2.1.11 Identify the location and the types of fire extinguishers and other fire equipment.
- 2.1.12 Demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.
- 2.1.13 Describe the effects of electrical shock on the human body.
- 2.1.14 Explain how to verify that circuits are de-energized.

#### Performance Standard 2.2: Practice Tool Identification and Safety

- 2.2.1 Identify the types of hand tools and power tools used in the plumbing profession.
- 2.2.2 Match tools to their intended use and purpose.
- 2.2.3 Perform a safety check before using tools.
- 2.2.4 Demonstrate safe use and maintenance of hand tools and power tools.
- 2.2.5 Explain storage procedures for torches and tanks.
- 2.2.6 Demonstrate safe use of torches for soldering.

### CONTENT STANDARD 3.0: Work with Plumbing Materials

#### Performance Standard 3.1: Identify Fittings and Valves

- 3.1.1 Identify the proper fittings and valves for specific systems.
- 3.1.2 Identify the parts of a fitting.
- 3.1.3 Apply the various fittings and valves by type, size, material, and application.

#### Performance Standard 3.2: Identify Types of Pipe

- 3.2.1 Identify the common pipes by type, size, and material.
- 3.2.2 Identify the proper pipes for specific systems.
- 3.2.3 Compare piping and tubing.

### CONTENT STANDARD 4.0: Apply Trade Mathematics

#### Performance Standard 4.1: Apply Mathematics

- 4.1.1 Use technology (i.e., calculator) to solve plumbing math measurement and calculation scenarios.
- 4.1.2 Identify industry standard units of measure.
- 4.1.3 Convert units of measure.
- 4.1.4 Identify basic geometry used in the plumbing profession.
- 4.1.5 Solve basic geometry problems, using formulas.
- 4.1.6 Solve problems relating to area, volume, weight, temperature and pressure.
- 4.1.7 Convert between fractions and decimals.
- 4.1.8 Identify measuring tools (i.e., tape measure) and how to use and read them.
- 4.1.9 Demonstrate the use of order of operations.
- 4.1.10 Define *makeup*.
- 4.1.11 Define *fitting allowance*.
- 4.1.12 Use manufacturer's tables to select pipe and fittings.
- 4.1.13 Measure pipe, using the following methods: end-to-end; end-to-center; center-to-center; end-to-face; face-to-face; and face-to-throat.
- 4.1.14 Determine end-to-end dimensions by including fitting allowances and makeup.

#### **CONTENT STANDARD 5.0: Interpret Drawings and Plans**

##### **Performance Standard 5.1: Interpret Isometric Drawings**

- 5.1.1 Describe the use of isometric drawings in plumbing.
- 5.1.2 Identify various plumbing symbols and abbreviations on isometric drawings.
- 5.1.3 Identify components and pipe segments in isometric drawings.

##### **Performance Standard 5.2:**

- 5.2.1 Describe basic plumbing symbols, abbreviations, and specifications on plans.
- 5.2.2 Identify site plans, floor plans, elevations, sectional views, details, schedules, and specifications.
- 5.2.3 Interpret plans, using an architect's scale.

#### **CONTENT STANDARD 6.0: Reference the Uniform Plumbing Code (UPC)**

##### **Performance Standard 6.1: Follow General Procedures**

- 6.1.1 Identify general plumbing requirements for hanging and securing piping.
- 6.1.2 Perform water pipe sizing calculations.
- 6.1.3 Perform drain and waste pipe sizing calculations.
- 6.1.4 Describe the use of traps and interceptors.
- 6.1.5 Reference the IDAPA plumbing rules and statutes (Title 54).
- 6.1.6 Perform fuel gas sizing calculations.
- 6.1.7 Associate the official UPC definitions to plumbing applications (e.g., *air break* versus *air gap*).

##### **Performance Standard 6.2: Cut and Join Pipes**

- 6.2.1 Join different types of pipes including ABS/PVC, PEX, galvanized, steel, copper, and cast-iron pipes.
- 6.2.2 Measure and mark various pipes.
- 6.2.3 Cut a variety of pipes, using associated pipe cutters and methods.
- 6.2.4 Set up a power-driven pipe-threading machine.
- 6.2.5 Thread a steel pipe with a pipe-threading machine.

##### **Performance Standard 6.3: Describe Plumbing Fixtures**

- 6.3.1 Explain the operating principles of water closets.
- 6.3.2 Install plumbing fixtures and faucets.
- 6.3.3 Describe compression and non-compression faucets.
- 6.3.4 Identify appurtenances related to fixtures.
- 6.3.5 Repair fixtures and faucets.

##### **Performance Standard 6.4: Explore Drain, Waste, and Vent (DWV) Systems**

- 6.4.1 Describe the components of DWV systems.



- 6.4.2 Explain the requirements for sizing of drains and vents.
- 6.4.3 Identify the types and parts of traps.
- 6.4.4 Describe the ways traps can lose their seals.
- 6.4.5 Identify the types of DWV fittings and their requirements.
- 6.4.6 Explain the importance of grade.
- 6.4.7 Describe the health concerns that may arise from faulty DWV systems

#### Performance Standard 6.5: **Explore Water Distribution Systems**

- 6.5.1 Identify water sources.
- 6.5.2 Describe water distribution systems.
- 6.5.3 Describe the purpose of backflow preventers.
- 6.5.4 Describe the health concerns that may arise from faulty water distribution systems.